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ARS 872 (2012) (English): Dry soybeans –
Specification



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Dry soybeans — Specification



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Foreword

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Introduction

Soybeans contain significant amounts of all the amino acids essential for humans. In the recent past, the range of soyfoods has expanded to include (i) fresh beans and sprouts, (ii) dairy substitutes such as soy milk, cheese etc., (iii) grain products such as soybread, pasta and flour, (iv) meat substitutes, and (v) soy spreads and pastes. Although, in recent years, soyfoods have been introduced in many more countries in the developed and developing world, the share of domestic soybean supplies intended for direct consumption - as opposed to crushing - remains below 10% at the global level.

Soy-foods are generally considered to be nutritious and healthy based on their nutrient composition which includes protein, fat, carbohydrates, dietary fibres as well as minerals and phytoestrogens (or isoflavones). With regard to the latter, recent scientific studies associate the consumption of phytoestrogen-rich diets –with a lower risk of coronary heart diseases, osteoporosis, hormone-dependent forms of cancer and menopausal symptoms. The health-benefits of isoflavones contained in soyfoods have been explained by their structural resemblance to endogenous oestrogen, showing oestrogenic and anti-oestrogenic properties as well as anti-oxidative, anti-proliferative and anti-angiogenic properties which are non-hormonally dependent.

Based on the above and considering the economic and technical limitations prevailing in tropical developing countries, the direct consumption of soybeans as a nutritious food that is economically accessible for large parts of the population appears to be appealing.

Dry soybeans — Specification

1 Scope

This African Standard specifies the requirements and methods of sampling and test for dry whole soybeans of varieties (cultivars) grown from *Glycine max* (L.) Merr. intended for human consumption.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 520, *Cereals and pulses — Determination of the mass of 1000 grains*

ISO 605, *Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods*

ISO 2164, *Pulses — Determination of glycosidic hydrocyanic acid*

ISO 2171, *Cereals, pulses and by-products — Determination of ash yield by incineration*

ISO 4112, *Cereals and pulses — Guidance on measurement of the temperature of grain stored in bulk*

ISO 4174, *Cereals, oilseeds and pulses — Measurement of unit pressure loss in one-dimensional air flow through bulk grain*

ISO 5223, *Test sieves for cereals*

ISO 5527, *Cereals — Vocabulary*

ISO 6322-1, *Storage of cereals and pulses — Part 1: General recommendations for the keeping of cereals*

ISO 6322-2, *Storage of cereals and pulses — Part 2: Practical recommendations*

ISO 6322-3, *Storage of cereals and pulses — Part 3: Control of attack by pests*

ISO 6639-1, *Cereals and pulses — Determination of hidden insect infestation — Part 1: General principles*

ISO 6639-2, *Cereals and pulses — Determination of hidden insect infestation — Part 2: Sampling*

ISO 6639-3, *Cereals and pulses — Determination of hidden insect infestation — Part 3: Reference method*

ISO 6639-4, *Cereals and pulses — Determination of hidden insect infestation — Part 4: Rapid methods*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 13690, *Cereals, pulses and milled products — Sampling of static batches*

ISO 16002, *Stored cereal grains and pulses — Guidance on the detection of infestation by live invertebrates by trapping*

ISO 16050, *Foodstuffs — Determination of aflatoxin B₁, and the total content of aflatoxin B₁, B₂, G₁ and G₂ in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO/TS 16634-2, *Food products — Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content — Part 2: Cereals, pulses and milled cereal products*

ISO 20483, *Cereals and pulses — Determination of the nitrogen content and calculation of the crude protein content — Kjeldahl method*

ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

ISO 24557, *Pulses — Determination of moisture content — Air-oven method*

AOAC Official Method 2001.04, *Determination of Fumonisin B₁ and B₂ in corn and corn flakes — Liquid chromatography with immunoaffinity column cleanup*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1

soybeans

whole mature dry seeds of varieties (*Glycine max* (L.) Merr.)

3.2

colour

soybeans may be yellow, green, brown or black

3.3

damaged/defective grains

soybeans and pieces of soybeans that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mould-damaged, sprout-damaged, stinkbug-stung, or otherwise materially damaged. Stinkbug-stung kernels are considered damaged kernels at the rate of one-fourth of the actual percentage of the stung kernels.

3.4

foreign matter

any extraneous matter than dry soybeans or other food grains comprising of

- (a) "inorganic matter" includes metallic pieces, shale, glass, dust, sand, gravel, stones, dirt, pebbles, lumps or earth, clay, mud and animal filth etc;
- (b) "organic matter" consisting of detached seedcoats, straws, weeds and other inedible grains etc.

3.5

immature

immature damaged soybeans are characterized by a green exterior appearance in conjunction with green discolouration penetrating the cotyledon. Examination of the cotyledons is determined by cutting the soybeans in cross section. For grading purposes, immature damaged soybeans are considered as part of the "Total Damage" grade specification. Soybeans that are green in appearance and have no discolouration of the cotyledon or just a halo of green around the outside of the cotyledon are to be assessed against the overall colour of the sample.

3.6

poisonous, toxic and/or harmful seeds

any seed which if present in quantities above permissible limit may have damaging or dangerous effect on health, organoleptic properties or technological performance such as Jimson weed — dhatura (*D. fastuosa* Linn and *D. stramonium* Linn.) corn cokle (*Agrostemma githago* L., *Machai Lallium remulenum* Linn.) Akra (*Vicia* species), *Argemone mexicana*, Khesari and other seeds that are commonly recognized as harmful to health

3.7

rancid

Soybeans in various stages of rancidity are characterized by a deep pink discolouration on the seed coat and varying degrees of discolouration of the cotyledon.

3.8

splits

broken soybean seeds that are less than three-quarters of the whole seed, and cotyledons that are loosely held together by the seed coat.

4 Quality requirements

4.1 General requirements

Soybeans shall meet the following general requirements/limits as determined using the relevant standards listed in Clause 2:

- a) shall consist of grain that consists of 50 % or more of whole or broken soybeans (*Glycine max* (L.) Merr.) that will not pass through a 3.175 mm round-hole sieve and not more than 10.0 percent of other grains for which standards have been established;
- b) shall be clean, well-filled, wholesome, uniform in size, shape, colour and in sound merchantable conditions;
- c) shall be free from substances which render them unfit for human or animal consumption or processing into or utilisation thereof as food or feed;
- d) shall be free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration;
- e) shall be free of pests, live animals, animal carcasses, animal droppings, fungus infestation, added colouring matter, moulds, impurities of plant and animal origin including insects, rodent hair and excreta and shall meet any other sanitary and phytosanitary requirements;
- f) shall be free from micro-organisms and substances originating from micro-organisms, fungi or other poisonous or deleterious substances in amounts that may constitute a hazard to human health.
- g) shall be free from toxic or noxious seeds that are commonly recognized as harmful to health;

- h) shall contain no chemical residues which exceed the prescribed maximum residue limit;
- i) shall contain not more than 10 microgram per kilogram aflatoxin of which not more than 5 microgram per kilogram may be aflatoxin B1.

4.2 Specific requirements

4.2.1 Grading

Soybeans may be graded into three grades on the basis of the tolerable limits established in Table 1 which shall be additional to the general requirements set out in this standard.

4.2.2 Ungraded soybeans

Ungraded soybeans shall be soybeans which do not fall within the requirements of Grades 1, 2 and 3 of this standard but meet the minimum requirements provided in 4.1 and are not rejected soybeans. Ungraded soybeans can be sorted out to Grade 1, 2 or 3 in accordance with the relevant procedures.

4.2.3 Reject grade soybeans

This comprises soybeans which have objectionable odour, off flavour, living insects or which do not possess the quality characteristics specified in Table 1. They cannot satisfy the conditions of ungraded soybeans and shall be graded as reject soybeans and shall be regarded as unfit for human consumption.

Table 1 — Specific requirements

Characteristics	Maximum limits			Method of test
	Grade 1	Grade 2	Grade 3	
Moisture, % m/m	13.0	13.0	13.0	ISO 711 ISO 712
Test weight kg/h (g/0.5L) min.	70(357)	68(347)	66(337)	ISO 605
Foreign matter, % m/m	1	2	3	
Inorganic matter, % m/m	0.1	0.3	0.5	
Broken/split grains, % m/m	1	2.5	5	
Pest damaged grains, % m/m	0.3	0.8	1.5	
Rotten & diseased grains, % m/m	0.2	0.5	1.0	
Heat damaged grains %m/m	0.1	0.2	0.5	
Contrasting colours, % m/m	2	3	5	
Immature/shrivelled grains, % m/m	0.1	0.2	0.5	
Filth, % m/m	0.1	0.1	0.1	
Total defective grains, % m/m	2	3	5	
Total aflatoxin (AFB ₁ +AFB ₂ +AFG ₁ +AFG ₂), ppb, max	10			ISO 16050
Aflatoxin B ₁ only, ppb, max	5			
Fumonisin, ppm, max	2			AOAC 2001.04

5 Contaminants

5.1 Heavy metals

Soybeans shall comply with those maximum limits for heavy metals established by the Codex Alimentarius Commission for this commodity.

5.2 Pesticide residues

Soybeans shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity

5.3 Mycotoxin limits

Soybeans shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity. In particular, total aflatoxin levels in soybeans for human consumption shall not exceed 10 µg/kg (ppb) with B₁ not exceeding 5 µg/kg (ppb) when tested according to ISO 16050.

6 Hygiene

6.1 Soybeans shall be produced, prepared and handled in accordance with the provisions of appropriate sections of ARS 53.

6.2 When tested by appropriate standards of sampling and examination listed in Clause 2, the products:

- shall be free from microorganisms in amounts which may represent a hazard to health and shall not exceed the limits stipulated in Table 2;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

Table 2 — Microbiological limits

	Type of micro-organism	Limits	Test method
i)	Yeasts and moulds, max. per g	10 ⁵	ISO 21527-2
ii)	<i>Staphylococcus aureus</i> per 25 g	Not detectable	ISO 6888
iii)	<i>E. Coli</i> , max. per g	Not detectable	ISO 7251
iv)	<i>Salmonella</i> , max. per 25 g	Not detectable	ISO 6579

7 Packaging

7.1 Soybeans shall be packed in suitable packages which shall be clean, sound, free from insect, fungal infestation and the packing material shall be of food grade quality.

7.2 Soybeans shall be packed in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.

7.3 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavour to the product.

7.4 Each package shall contain soybeans of the same type and of the same grade designation.

7.5 If soybeans are presented in bags, the bags shall also be free of pests and contaminants.

7.6 Each package shall be securely closed and sealed.

8 Labelling

8.1 In addition to the requirements in ARS 56, each package shall be legibly and indelibly marked with the following:

- i) product name as “Dry Soybeans”;
- ii) variety;
- iii) grade;
- iv) name, address and physical location of the producer/ packer/importer;
- v) lot/batch/code number;
- vi) net weight, in kg;
- vii) the declaration “Food for Human Consumption”
- viii) storage instruction as “Store in a cool dry place away from any contaminants”;
- ix) crop year;
- x) packing date;
- xi) instructions on disposal of used package;
- xii) country of origin;
- xiii) a declaration on whether the soybeans were genetically modified or not.

8.2 Labelling of non-retail containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9 Sampling methods

Sampling shall be done in accordance with the ISO 13690.

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Malawi Standard, MBS 244:1991, *Soya bean — Specification*

United States Standards for Soybeans, Effective September, 2007

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